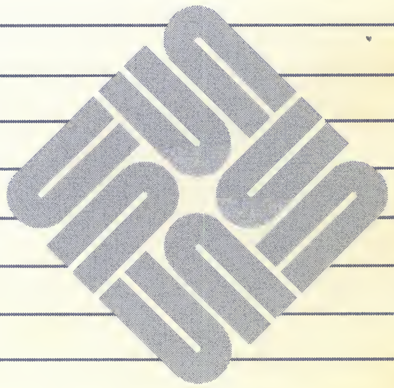
sun®
microsystems

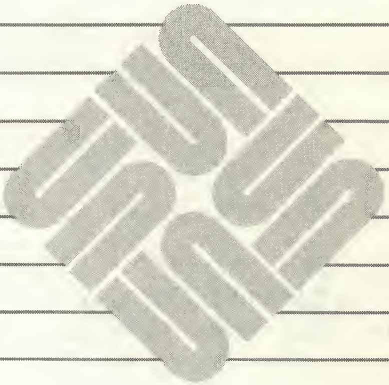
VME/SMD Disk Controller Installation Notes



Part No: 813-1027-05
Revision A of August 2, 1988

sun microsystems

VME/SMD Disk Controller Installation Notes



Part No: 813-1027-05
Revision A of August 2, 1988

Credits and Trademarks

Multibus is a trademark of Intel Corporation.

VMEbus is a trademark of Motorola, Inc.

Sun Microsystems and **Sun Workstation** are registered trademarks of Sun Microsystems, Incorporated. **Sun-3, Sun3, Sun-3/xxx, Deskside, SunStation, SunCore, SunWindows**, and **DVMA** are trademarks of Sun Microsystems, Incorporated.

UNIX is a trademark of AT&T Bell Laboratories.

Xylogics is a trademark of Xylogics Incorporated.

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Copyright © 1988 by Sun Microsystems, Inc. – Printed in U.S.A.

This publication is protected by Federal Copyright Law, with all rights reserved. No part of this publication may be reproduced, stored in a retrieval system, translated, transcribed, or transmitted, in any form, or by any means: manual, electric, electronic, electromagnetic, mechanical, chemical, optical, or otherwise, without prior explicit written permission from Sun Microsystems.

Contents

Chapter 1 Inspection and Unpacking **3**

1.1. Inspection 3
1.2. Unpacking 3
1.3. Other Documentation You Will Need 3

Chapter 2 General Description and Cautions **7**

2.1. General Description 7
2.2. Important Cautions during Installation 7
  Power Off Caution 7
  Electrostatic Discharge Caution 7
  Springfinger Caution 8

Chapter 3 Board Location and Installation Instructions **11**

3.1. Tools Required 11
3.2. Board Location 11
3.3. Board Installation 11
  Boot PROM Check 11
  Graceful Power–Down 12
  Installation 12
3.4. System Hardware Configuration 13
  Board Removal (if necessary) 14
  Installation of Additional Controller Board(s) 14
3.5. Operating System Configuration 14

Chapter 4 Cabling **17**
4.1. General 17
Command Cables 17
Data Cables 18

Chapter 5 Boot PROM Check **25**
5.1. How to Check for the Correct Boot PROM 25
5.2. Boot PROM Replacement and Which PROM to Use 25
PROM Installation 26

Figures

Figure 3-1 Backplane Jumper Locations 13

Figure 4-1 Cabling – 575 Mbyte Drives 19
Figure 4-2 Cabling – Sun Mass Storage Pedestal 20
Figure 4-3 Cabling – Sun 900 Mbyte Drive(s) 21

1

Inspection and Unpacking

Inspection and Unpacking **3**

1.1. Inspection 3
1.2. Unpacking 3
1.3. Other Documentation You Will Need 3

1

Inspection and Unpacking

1.1. Inspection

When you receive your shipment, inspect all shipping cartons *immediately* for any evidence of damage. If any carton is severely damaged, request that the carrier's agent be present when the carton is opened. If the carrier's agent is not present when a carton is opened and the contents are found to be damaged, keep all contents and packing materials for the agent's inspection.

1.2. Unpacking

All materials (except tools) necessary to install the VME/SMD Disk Controller into the Sun Logic Enclosure and connect the controller to the disk drive(s) are packed into one box.

Open the box and remove the board, cables and documentation packed between the foam layers.

Do not remove the the board from the anti–static bag yet. Before removing the anti–static bag, read the **Cautions** in Section 2.2 .

1.3. Other Documentation You Will Need

- ☐ Cardcage Slot Assignments and Backplane Configuration Procedures
  Sun P/N 813-2004-xx
- ☐ Cardcage Slot Assignments and Backplane Configuration Procedures for the VME/SMD Disk Controller
  Sun P/N 813-2051-xx
- ☐ VME/SMD Disk Controller Configuration Procedures
  Sun P/N 813-2033-xx
- ☐ Installing the SunOS™
  Sun P/N 800-1732-xx
- ☐ System Administration and Networking Manual
  Sun P/N 800-1733-xx
- ☐ If you are upgrading from a Xyloxics 450/451 to the VME/SMD Disk Controller, you will also need VME/SMD Disk Controller Upgrade Instructions
  Sun P/N 813-1043-xx.

2

General Description and Cautions

General Description and Cautions 7

- 2.1. General Description 7
- 2.2. Important Cautions during Installation 7
  - Power Off Caution 7
  - Electrostatic Discharge Caution 7
  - Springfinger Caution 8

2

General Description and Cautions

2.1. General Description

The VME/SMD Disk Controller is a high performance disk drive controller that has a maximum Direct Memory Access (DMA) transfer rate of 9.0 Megabytes per second. This Disk Controller supports overlapped seeks, multiple drive types, disk transfer rates of up to 2.4 Megabytes per second, and a *maximum* of four SMD disk drives per Controller.

The VME/SMD Disk Controller communicates with Sun equipment via the VME bus in the Sun Logic Enclosure.

The Disk Controller is supported by Sun software release 4.0 and above. Previous software releases are not compatible with this Disk Controller.

NOTE

The VME/SMD Disk Controller *is manufactured for Sun Microsystems by Xylogics Inc. Xylogics calls it the* 7053, *and you may find references to the 7053 in various places. The* Xylogics 7053 *and the* VME/SMD Disk Controller *are the same product, and this product is available **only** from Sun Microsystems.*

2.2. Important Cautions during Installation

Power Off Caution

Turn off the power and disconnect the power cord from the Logic Enclosure before inserting or removing any boards.

Electrostatic Discharge Caution

Electrostatic Discharge Caution — Some of the devices on Sun boards are very sensitive to electrostatic discharge (they can be permanently damaged). An electrostatic charge can build up in the human body and then discharge when you touch the board.
Before handling any board, make sure that you have placed your hand on a conductive surface that is grounded to a common earth ground, (such as the metal screws on an AC receptacle cover) to discharge the static electricity present in your body.

Springfinger Caution

Springfinger Caution — Springfingers are metal strips that are installed between the edge of the PC board and the outer panel to reduce RFI emissions. Serrated metal ''fingers'' protrude from either side of the strip.

If a board WITH springfingers is installed next to a board WITHOUT springfingers, the insulator shield on the outside of the fingers MUST be present to prevent possible shorting of component leads to the springfingers.

Installation of a board WITHOUT springfingers may affect RFI emissions and may therefore affect FCC compliance. Sun will no longer be responsible for FCC compliance if non-springfingered boards are added to a system originally shipped WITH springfingers and FCC approval.

If a logic enclosure contains boards both WITH and WITHOUT springfingers, use the following guidelines:

- Before removing a board WITHOUT springfingers, remove the board below it (or to the left of it in the pedestal model) if that board is equipped WITH springfingers and an outer insulator shield.
- Replace any filler panel equipped WITH springfingers by pulling out the air restrictor panel far enough to allow the springfingers to lay against the panel. Push both units into place simultaneously and secure with the appropriate fasteners. This procedure makes replacement of the filler panels easier, and reduces the chance of damage to the springfingers.
- Always install a board WITHOUT springfingers first, and then replace the board WITH springfingers and insulator shield in the slot below it (or to the left).

If a board WITH springfingers is installed next to a board or filler panel also equipped WITH springfingers, the outside insulator shields should be removed.

Ensure that the insulator strip between the inner side of the springfingers and the PC board is intact at all times.

When removing and replacing boards with springfingers, check the condition of the insulator strip/shield(s) and replace if damaged.

Call 800 USA-4SUN with any questions, or for information on how to obtain additional insulator strips or shields.

3

Board Location and Installation Instructions

Board Location and Installation Instructions **11**

3.1. Tools Required 11
3.2. Board Location 11
3.3. Board Installation 11
  Boot PROM Check 11
  Graceful Power–Down 12
  Installation 12
3.4. System Hardware Configuration 13
  Board Removal (if necessary) 14
  Installation of Additional Controller Board(s) 14
3.5. Operating System Configuration 14

3

Board Location and Installation Instructions

NOTE For Datacenter (Rack) products, *if you received your VME/SMD Disk Controller Board, Disk Drive(s) and the System Logic Enclosure preinstalled in a Sun rack, you may skip to Chapter 5.*

For Deskside (Pedestal) products, *if you received your VME/SMD Disk Controller Board pre-installed in the Logic Enclosure Pedestal, you may skip to Chapter 4.*

3.1. Tools Required

The following tools will be needed to install the VME/SMD Disk Controller Board:

- ☐ Set of Metric hexagonal (Allen) wrenches, including 2.5mm.
- ☐ Phillips screwdrivers #1 and #2.
- ☐ Standard blade screwdriver.

3.2. Board Location

Refer to the *Cardcage Slot Assignments and Backplane Configuration Procedures for the VME/SMD Disk Controller* for information about Logic Enclosure backplane jumpering and location of the Disk Controller Board in your particular Sun system.

3.3. Board Installation

WARNING ***If this is an upgrade from the Model 451 Disk Controller to the VME/SMD Disk Controller, it is important to note that the disk drive formats are not compatible between these two controllers.***

Boot PROM Check

Before powering down your system to install the new Disk Drive Controller, perform the Boot PROM check described in Chapter 5. Once you are sure the system has the correct Boot PROM, return to this Section and resume board installation.

NOTE *If you are upgrading from a Model 451 Disk Controller to a VME/SMD Disk Controller, the disk drives connected to the controller will need to be reformatted, resulting in all data on those disks being destroyed. If you wish to retain that data, back up the disk data onto tape before beginning the upgrade procedure. The SunOS utilities* `dump` *and* `tar` *can be used for this purpose. (See VME/SMD Disk Controller Upgrade Instructions, part number 813-1043-xx.)*

Graceful Power–Down

If the system is running and you want to power–down, ensure that the system administrator has performed the following steps.

1. Warned clients or other workstation users to log out.
2. As super–user, entered a command such as:

   `/etc/halt` or `/etc/fasthalt`

   The program called by this command ensures that all data in the buffers is written to the disk before the SunOS™ operating system is halted.

When the system is halted, you may turn the system power off.

Installation

1. Power–down and unplug the power cord from System Logic enclosure.
2. Remove the anti–static bag from the Controller board.
3. Refer to the *VME/SMD Disk Controller Configuration Procedures*, and verify that the jumper and switch settings are set to the correct positions for your application.
4. Using the *Card Cage Slot Assignments and Backplane Configuration Procedures for the VME/SMD Disk Controller*, choose the target slot in the Logic Enclosure card cage. Using the 2.5mm hexagonal wrench, remove the filler panel on the rear of the card cage corresponding to the target slot (save the screws). Remove the air restrictor also.
5. Insert the Disk Controller Board into the the cardcage so that the component side faces towards the right (when viewed from the rear). The board should slide into the cardcage slot with little resistance and fit snugly when seated into the backplane connectors. While a moderate amount of force is required to seat the board, anything in excess of this is cause for inspection. Check the cardcage slot for any obvious obstructions, and both the board and the backplane for damage (bent connector pins, etc.).
6. Using the hex head screws from step 4, secure the board to the card cage.

3.4. System Hardware Configuration

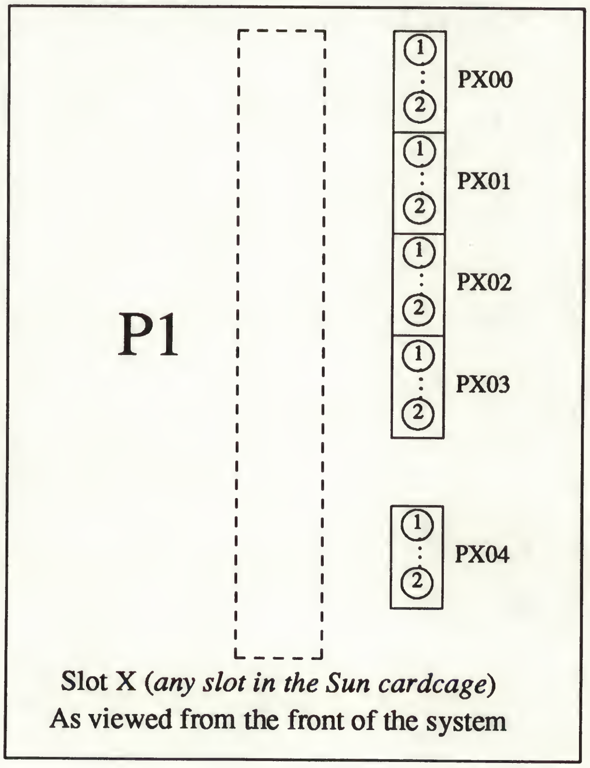
1. Power–down and unplug the power cord from System Logic enclosure.
2. Gain access to the solder side of the cardcage backplane in order to check the backplane jumpers (Correct location of the system backplane jumpers is described in the *Card Cage Slot Assignments and Backplane Configuration Procedures for the VME/SMD Disk Controller*).

   ■ If you have a pedestal-type system, unsnap the front bezel and unfasten the four screws holding the hinged power supply panel in place. Insert a large, flat-blade screwdriver in the openings between the panel and the sides of the pedestal to release the panel from the pedestal. Gently lower the power supply tray.

   ■ If the system is rackmounted, unsnap the bezel and remove the 12 screws that secure the RFI shield.

   Ensure that all backplane jumpers are configured as indicated in the *Cardcage Slot Assignments and Backplane Configuration Procedures* and the special *Cardcage Slot Assignments and Backplane Configuration Procedures for the VME/SMD Disk Controller*.
   Figure 3-1 illustrates the backplane jumpers.

Figure 3-1 *Backplane Jumper Locations*



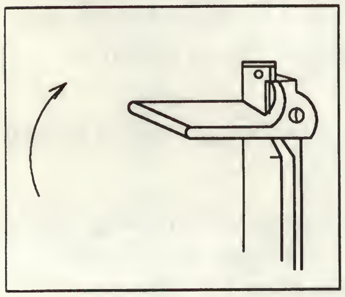
Slot X (*any slot in the Sun cardcage*)
As viewed from the front of the system

3. Close up the host system Logic Enclosure.

Board Removal (if necessary)

If it is necessary to remove a board from the Sun Logic Enclosure, perform the following steps:

1. Refer to the Subsection entitled *Graceful Power–Down* of Section 3.3 , and power-down the workstation.
2. Using a 2.5mm hex wrench, remove the screws securing the board assembly to the cardcage.
3. Referring to the drawing in the left margin, press the PC Board Extraction Levers (located at the top and bottom rear edge of the board assembly) outward. This should initiate board removal.
4. Pull out on the board assembly until it is free of the Logic Enclosure (remember to heed the Electrostatic Discharge Caution when handling the board assembly).



Extraction Lever

Installation of Additional Controller Board(s)

Repeat Sections 3.2, 3.3, and 3.4 to install each additional Controller.

3.5. Operating System Configuration

Refer to *Installing the SunOS*™ for information about the changes you will need to make to your operating system.

4

Cabling

Cabling **17**

4.1. General 17

Command Cables 17

Data Cables 18

4

Cabling

4.1. General

The VME/SMD Disk Controller can be used to drive up to 4 disk drives per controller, and special connectors and cables have been designed to perform this job.

There are three connectors on the rear panel of the controller. A single 62-Pin Command connector and two 50-Pin Data connectors. The Data connectors are labelled Data 2,3 and Data 0,1. The cables supplied will vary depending on the type of disk drive being used.

Command Cables

After installing the Command Cable into the Command connector on the VME/SMD Disk Controller, it should be connected to the disk drive with the highest Physical (Unit) Address number.

Daisy-chaining of the Command signals to the other drives controlled by the same Disk Controller is achieved through the use of Command "daisy chain" cables. These are discussed in detail in the Installation Manual you received with your Disk Drive(s) or Storage Pedestal(s). The Drive Installation Manual also discusses how to assign Physical (Unit) Address numbers to the drives, and gives specific information on connector locations and drive termination.

Sun 900 Mbyte Drive

> The Sun 900 Mbyte Drive has a single 60-Pin Command In connector. Therefore, the Command cable supplied with this Drive has a 60-Pin connector on one end for the Drive, and a 62-Pin connector on the other end for the Controller.

All Other Sun Drives

> All other disk drives, including the Sun Mass Storage Pedestal, use two connectors for Command In: one 37-Pin and one 25-Pin. These systems use a split Command cable that has a 62-Pin connector on one end, for connection to the Drive Controller, and two connectors (37- and 25-Pin) on the other end for connection to the Drive or Storage Pedestal.

Figures 4-1 and 4-2 show the general cabling scheme for all drives except the Sun 900 Mbyte.
Figure 4-3 shows the general cabling scheme for Sun 900 Mbyte Drives.

CAUTION **Command daisy chaining of two Storage Pedestals is not supported.**

NOTE *If only one drive is connected to the Disk Controller, the Command cable goes directly to the* Command In *connector on Drive 0.*

Data Cables

A Data cable has a 50-Pin connector on one end for connection to the Drive Controller. For the 900 Mbyte Drive, the other end of the cable has two 26-Pin connectors. For all other Sun Disk Drives, the other end of the cable has two 25-Pin connectors. The disk drive end of the Data cable connectors are labelled 0/2 and 1/3. The numbers on these labels refer to the Physical (or Unit) Address of the Disk Drive.

The bottom Data connector on the VME/SMD Drive Controller is labelled Data 0, 1, and the top Data connector is labelled Data 2, 3.

Therefore, if a Data cable is plugged in to the *bottom* Data connector on the Drive Controller, the other end of the cable should be plugged in to the Data connectors on Drive 0 and Drive 1.

NOTE *Note that the numerals* 0, *and* 1 *are the first numerals of the two Data connector labels.*

If a Data cable is plugged in to the *top* Data connector on the Drive Controller, the other end of the cable should be plugged in to the Data connectors on Drive 2 and Drive 3.

NOTE *Note that the numerals* 2, *and* 3 *are the second numerals of the two Data connector labels.*

NOTE *When installing cables, be sure to use the connector securing screws. Be careful though not to overtighten them. These screws need only to be "snug"; tightening them further may damage the connector.*

NOTE *When installing the cables, try your best not to turn the cables against the natural bend they acquired during shipping. Damage to the connectors can result if this advice is not followed.*

Figure 4-1 *Cabling – 575 Mbyte Drives*

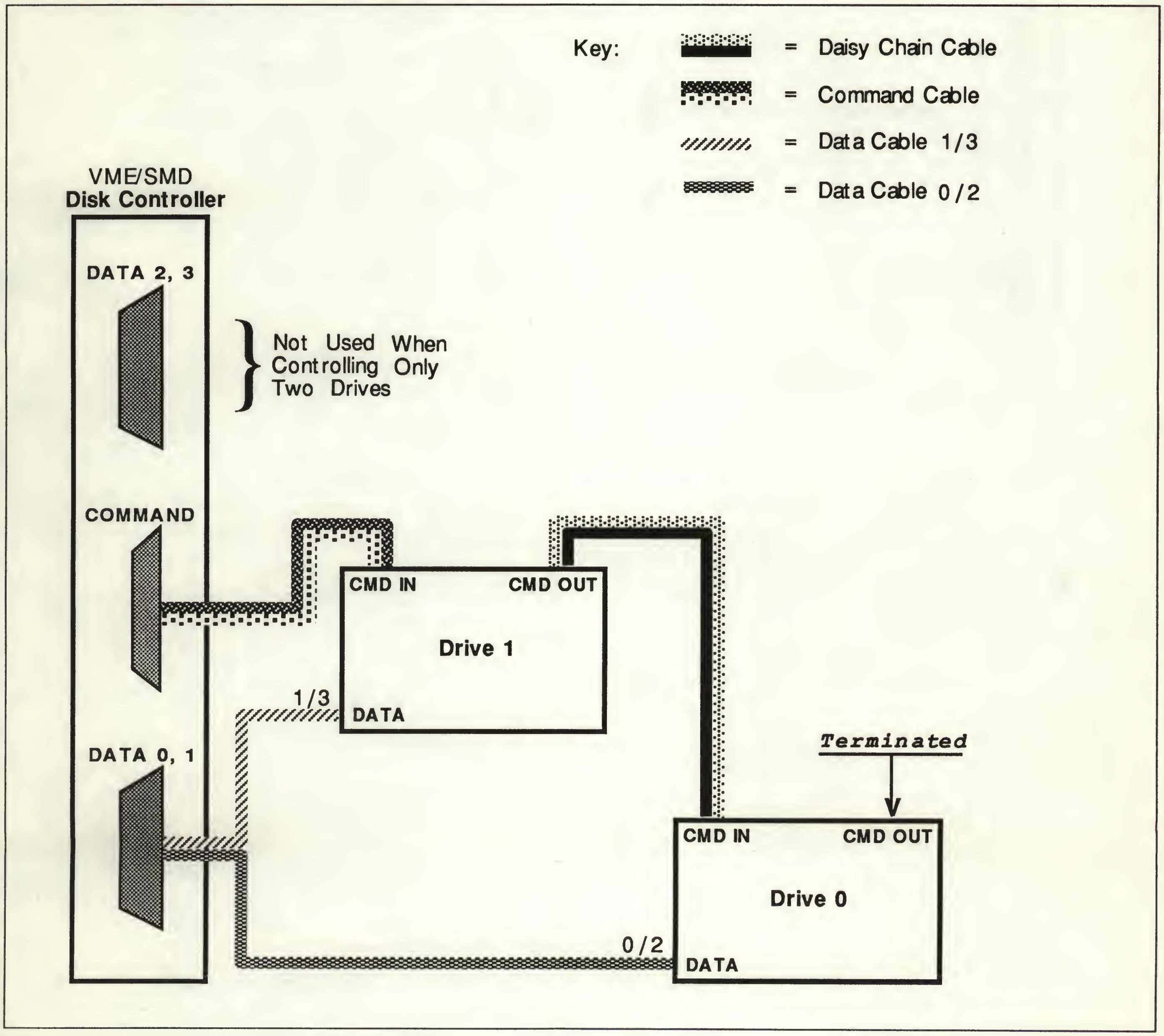


Figure 4-2 *Cabling – Sun Mass Storage Pedestal*

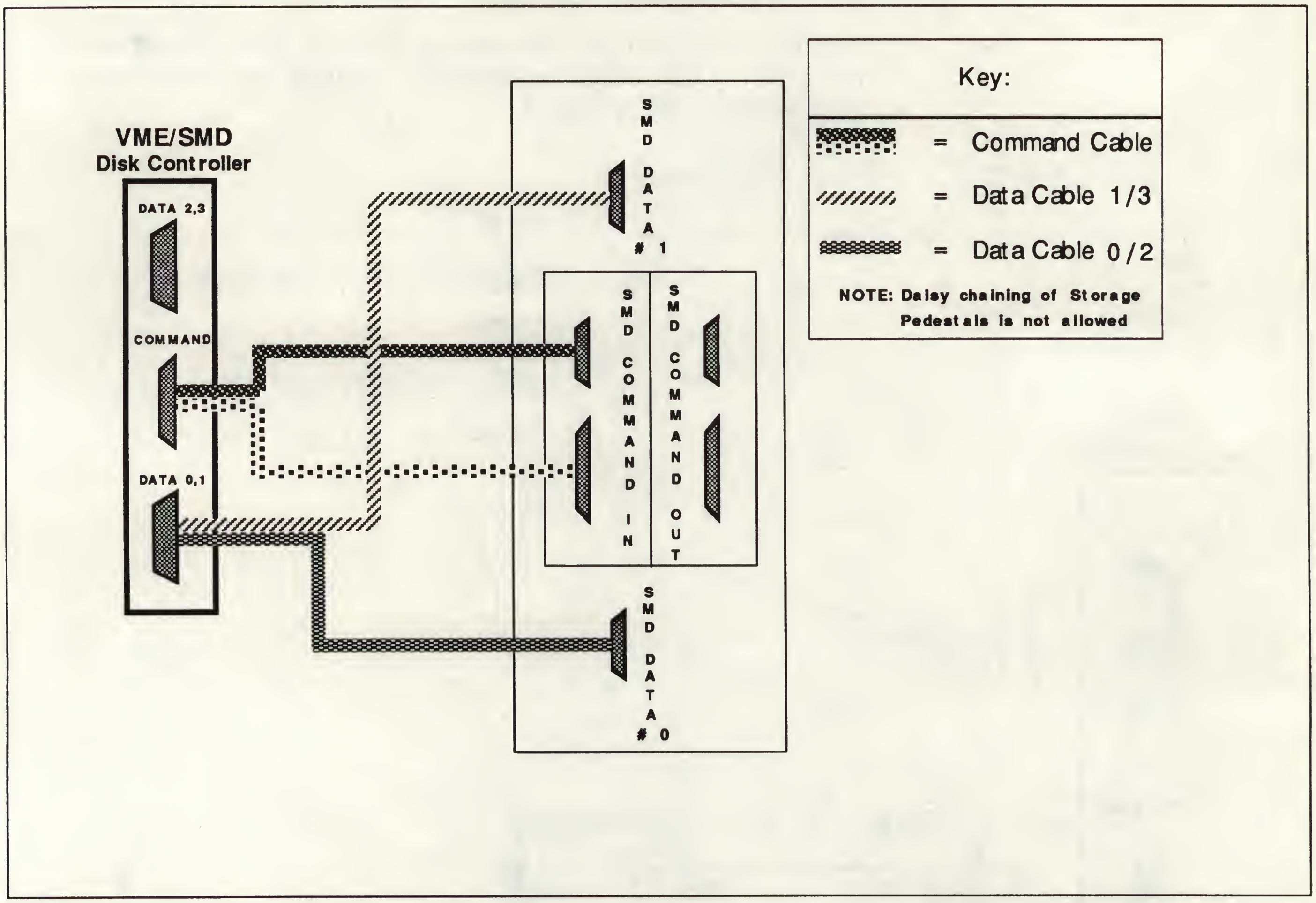
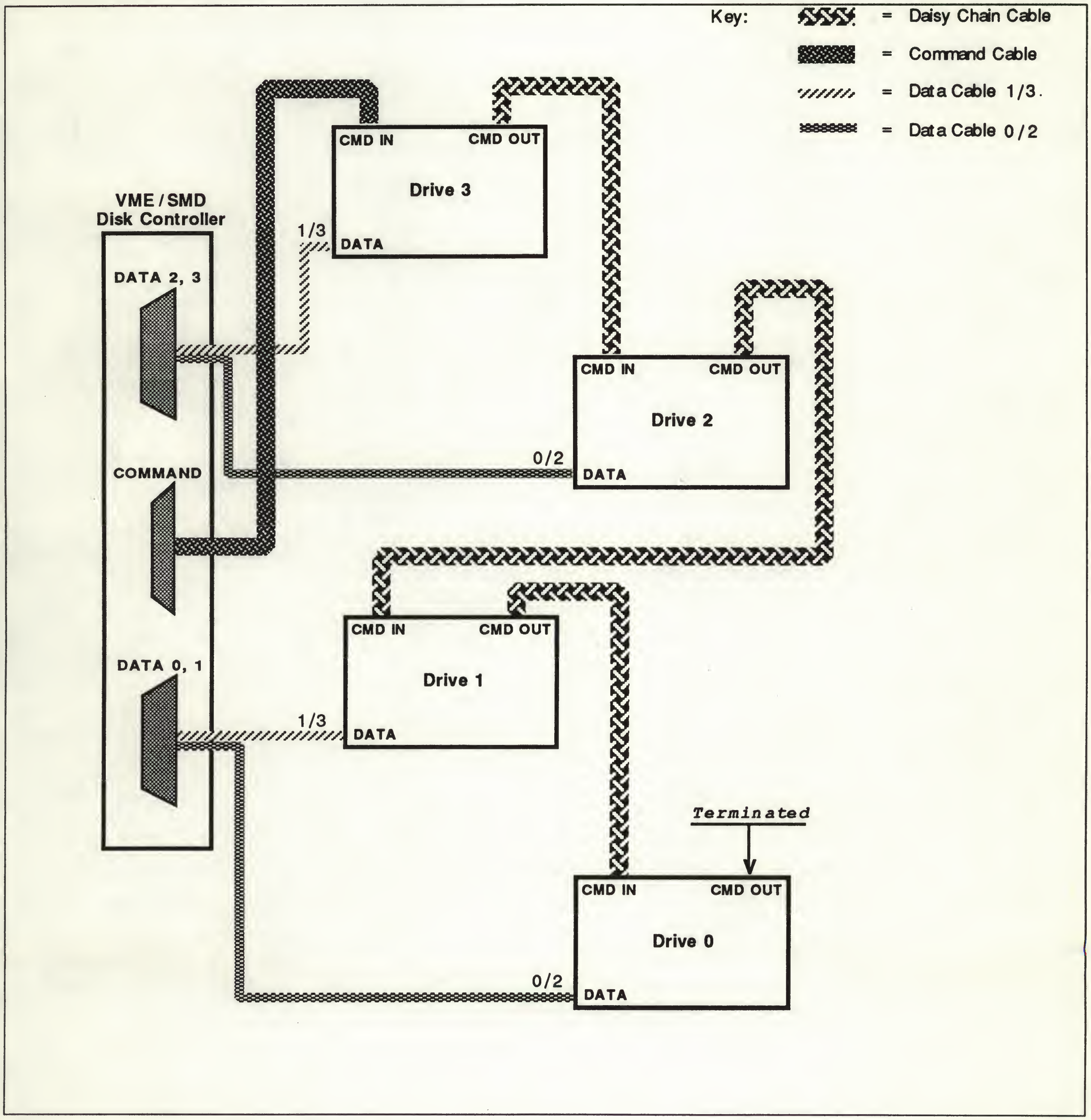


Figure 4-3 *Cabling – Sun 900 Mbyte Drive(s)*



5

Boot PROM Check

Boot PROM Check **25**

5.1. How to Check for the Correct Boot PROM 25

5.2. Boot PROM Replacement and Which PROM to Use 25

PROM Installation 26

5

Boot PROM Check

It is **very** important that you have the correct Boot PROM on the CPU Board. If you ordered this system as an upgrade to your existing Sun Workstation, an up-to-date Boot PROM was provided in the Sun VME/SMD Disk Controller Upgrade Kit.

5.1. How to Check for the Correct Boot PROM

An easy way to check for the correct Boot PROM is to enter the following command from the boot monitor prompt (>):

NOTE *The characters you are to enter on the keyboard look like this:* **`What you type`**.
Characters that are displayed by the computer are in `this typeface`.
Carriage returns are shown as [*Return*]

```
> b?  [Return]
```

The machine will answer with a number of lines describing various boot devices (these will vary depending on your system configuration). The line that must be present for your Disk Controller to run properly is:

```
xd:  Xylogics 7053 disk
```

If this line is not there, the Boot PROM is incorrect. Refer to the following Section for instructions.

5.2. Boot PROM Replacement and Which PROM to Use

One Boot PROM was provided in the Disk Controller Upgrade Kit.

- ☐ If you have a Sun-3/160 or Sun-3/180, use the PROM labelled:
  Rev. 2.7 or above (Sun P/N 520-1226-09, or later)
- ☐ If you have a Sun-3/260 or Sun-3/280, use the PROM labelled:
  Rev. 2.7 or above (Sun P/N 520-1399-06, or later)

Immediately discard the PROM that you did not use.

PROM Installation

CAUTION **The PROM can be *permanently* damaged by electrostatic discharge. Use the ground wrist strap provided in this kit when installing or handling the PROM.**

Sun-3/160 or Sun-3/180

At location C5 on the CPU board, install Boot PROM number 520-1226-xx, where "xx" is 09 or greater (which contains code revision 2.7 or greater).

Sun-3/260 or Sun-3/280

At location C1 on the CPU board, install Boot PROM number 520-1399-xx, where "xx" is 06 or greater (which contains code revision 2.7 or greater).

Perform the Boot PROM check described in Section 5.1. If the Boot PROM check does not return the correct information, contact Sun's Field Service Center at 800-USA-4SUN for further assistance.

Revision History

Dash Number	Revision	Date	Comments
05	A	August 2, 1988	First release of this manual

Corporate Headquarters
Sun Microsystems, Inc.
2550 Garcia Avenue
Mountain View, CA 94043
415 960-1300
TLX 37-29639
For U.S. Sales Office locations, call:
800 821-4643
In CA: 800 821-4642

European Headquarters
Sun Microsystems Europe, Inc.
Sun House
31-41 Pembroke Broadway
Camberley
Surrey GU15 3XD
England
0276 62111
TLX 859017

Australia: (02) 436 4699
Canada: 416 477-6745
France: (1) 46 30 23 24
Germany: (089) 95094-0
Japan: (03) 221-7021
Nordic Countries: (08) 764 78 10
Switzerland: (1) 82 89 555
The Netherlands: 02155 24888
UK: 0276 62111

Europe, Middle East, and Africa, call European Headquarters:
0276 62111

Elsewhere in the world, call Corporate Headquarters:
415 960-1300
Intercontinental Sales